

Disparate Patterns of Prenatal Care Utilization Stratified by Medical and Psychosocial Risk

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Abstract To evaluate patterns of prenatal care utilization stratified by medical and psychosocial risk. A retrospective cohort of 786 pregnant women who subsequently delivered live births from 1999 to 2003 at the University of Michigan were classified into high medical, high psychosocial, high medical and high psychosocial (dual high risk) and low-risk pregnancies. Chi-square and logistic regression analyses assessed the association between risk and prenatal care utilization using the Kotelchuck Index. Of 786 pregnancies, 202 (25.7 %) were high medical risk, 178 (22.7 %) were high psychosocial risk, 227 (28.9 %) were dual high risk and 179 (22.8 %) were low-risk. Over 31 % of dual high risk and 25 % of high medical risk pregnancies received “adequate plus” prenatal care versus 10 % of high psychosocial risk pregnancies. In multivariate analyses, adjusted for risk, race and insurance, high psychosocial risk pregnancies (OR = 1.69; 95 % CI 1.06–2.72) were significantly more likely to receive inadequate prenatal

care than care of greater intensity. Many high psychosocial risk pregnancies do not receive adequate prenatal care.

Keywords Health care utilization · Prenatal care · Risk assessment

Introduction

Pregnancies complicated by medical and psychosocial risk factors are at significantly increased risk of adverse maternal and neonatal outcomes and represent a major social and economic burden [1, 2]. Collectively referred to as “high-risk,” pregnancies complicated by medical risk factors such as chronic hypertension and psychosocial risk factors such as a lack of social support have been associated with greater rates of low birth weight (LBW), preterm birth and infant mortality as well as greater rates of adverse maternal outcomes such as postpartum depression [3–5].

A comprehensive risk assessment, performed at the initial prenatal care visit, is intended to identify medical and psychosocial risk factors so that providers can tailor the content, frequency and structure of prenatal care services to the identified level of risk [6]. Risk-appropriate prenatal care is designed to improve the effectiveness and efficiency of prenatal care by delivering intensive prenatal care services to high-risk patients and basic prenatal care to low-risk patients [7]. Tailored, risk-appropriate prenatal care has been shown to improve adverse birth outcomes for high-risk patients and minimize the use of costly health care resources for low-risk patients [8–10].

Although risk-appropriate prenatal care has been shown to improve maternal and neonatal outcomes, few studies have evaluated prenatal care utilization patterns based on the risk status of individual patients. The majority of

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previous research uses demographic predictor variables to characterize the over and underutilization of prenatal care services and does not account for antepartum medical and psychosocial risk [11, 12]. Therefore, the objective of this study was to describe patterns of prenatal care utilization in women with medical and psychosocial risk factors.

Research Methods

Recruitment and Study Sample

This study involved a secondary analysis of the Health and Pregnancy Project (HPP), a cohort study examining general health behaviors, substance abuse, and depression in pregnancy conducted from 1999 through 2003 [13]. A convenience sample of pregnant women was recruited from a group of obstetrics clinics throughout southeast Michigan. Pregnant women were approached by research staff while waiting for a prenatal visit and were asked to complete a self-administered survey. Comprehensive written consent was obtained from each study participant. The University of Michigan Medical School Institutional Review Board approved all procedures for the HPP and the secondary analyses necessary for this study.

Of the 1,479 women approached, approximately 90 % agreed to complete the screening survey ($n = 1,331$ women screened). Women who chose not to participate refused further contact with the research assistant. Therefore, it was not possible to collect information on their characteristics. In addition, we excluded 449 women who were patients in other health systems, women with fetal deaths in utero ($n = 7$), and women who delivered at less than 20 weeks gestational age ($n = 9$). This yielded a sample size of 866 eligible women who delivered in our university health system. Within the study sample, 77 women were missing prenatal care record data to calculate prenatal care utilization and 3 women were missing data regarding ethnicity, insurance status and parity. The analyses reported here exclude these women, leaving 786 subjects (91 % of the eligible sample).

Demographic and Risk Measures

Survey measures included demographic information, self-reported smoking during pregnancy, problem alcohol use, use of prescription medications, a history of depression and current depressive symptoms. Past history of depression was measured using items derived from the Diagnostic Interview Schedule (DIS-III-R) [14]. These items ask participants if "... you had 2 weeks or more when nearly every day you felt sad, blue, or depressed or in which you lost all interest in things like work?" Problem alcohol use

was assessed with the TWEAK alcohol screener. The TWEAK is a five-item screener that contains questions from the MAST, CAGE, and T-ACE and yields a total severity score of 0–7.36 [15]. Using a cutoff score of 2, the TWEAK demonstrates good sensitivity and specificity in screening for at-risk drinking in pregnant women [16].

Current depressive symptoms were measured by the CES-D [17]. Items on the CES-D cover the previous 7 days and are rated on a 4-point scale. A total score is derived by summing the ratings across the scale's 20 items. In a postpartum sample, the sensitivity and specificity of the CES-D to detect depression (major and minor) were 0.60 and 0.92, respectively [18]. This is comparable to the diagnostic properties of other depression screening instruments in the perinatal population [19]. A standard cutoff point of 16 or higher has been used as a recommendation for determining clinically significant symptoms [20–22].

Demographic information as well as results from the DIS-III-R, TWEAK and CES-D were derived from the results of the HPP survey. For this secondary analysis of the HPP cohort, the remaining medical and psychosocial risk factors were obtained from a retrospective review of electronic medical records including prenatal care, ultrasound, triage and referral notes. Pregnancies were divided into 4 broad categories: (1) high medical risk pregnancies, defined as pregnancies complicated by only medical risk factors, (2) high psychosocial risk pregnancies, defined as pregnancies complicated by only psychosocial risk factors (3) dual high risk pregnancies, defined as pregnancies complicated by medical and psychosocial risk factors and (4) low-risk pregnancies, defined as pregnancies that were not complicated by any medical or psychosocial risk factors.

High Medical Risk

Pregnancies complicated by at least one medical risk factor were classified as high medical risk pregnancies. Medical risk factors included: (1) a history of preterm delivery or (2) a maternal medical comorbidity such as chronic hypertension or (3) a current pregnancy complication such as gestational diabetes. Maternal medical comorbidities included: chronic hypertension, pre-gestational diabetes, renal disease, systemic lupus erythematosus (SLE), asthma, a history of a deep vein thrombosis (DVT), neurological disease, thyroid disease, advanced maternal age (age > 35 years), a history of tuberculosis (TB), HIV, anemia (Hct < 30), cancer, inflammatory bowel disease, a thrombophilia or coagulopathy such as VonWillebrand's disease, thalassemia, adrenal disease, hepatitis, major cardiovascular disease such as aortic stenosis, multiple sclerosis or genital herpes. Current pregnancy complications included: gestational diabetes, surgery during pregnancy, pyelonephritis, hyperemesis,

intrauterine growth restriction (IUGR) by ultrasound, abruption, in vitro fertilization (IVF), placenta previa, preterm premature rupture of membranes (PPROM), preterm labor, multiple gestation, pre-eclampsia, a major uterine anomaly, hydrops, oligohydramnios, polyhydramnios, fetal arrhythmia, a major fetal anomaly, isoimmunization or a placental tumor.

High Psychosocial Risk

Pregnancies complicated by at least one psychosocial risk factor were classified as high psychosocial risk. Psychosocial risk factors included: (a) the use of illicit drugs, alcohol or tobacco or (b) a documented psychiatric diagnosis or (c) a self-reported history of domestic violence or abuse during pregnancy. The use of illicit drugs, alcohol or tobacco included: a self-reported history of or current illicit drug use, the use of benzodiazepines or methadone during pregnancy, cigarette smoking during pregnancy or a positive TWEAK screen (TWEAK > 2). A documented psychiatric diagnosis included: a documented diagnosis of depression, anxiety or bipolar disorder during pregnancy, treatment for depression or anxiety during pregnancy, a self-reported history of depression, treatment for depression prior to pregnancy and current depressive symptoms (CES-D score > 16).

Dual High Risk

Women with at least one medical and at least one psychosocial risk factor were classified as dual high risk.

Low-Risk

Women without any medical or psychosocial risk factors were classified as low-risk.

Prenatal Care Utilization Measures

Prenatal care utilization was calculated using the Kotelchuck Adequacy of Prenatal Care Utilization Index (APNCU) which combines the timing of the first prenatal visit with the ratio of observed to expected number of prenatal care visits attended based on prenatal care standards of the American Congress of Obstetricians and Gynecologists (ACOG) [23]. Women were categorized by the percentage of recommended prenatal care visits attended, as follows: “inadequate” (less than 50 % of expected visits); “intermediate” (50–79 %); “adequate” (80–109 %); “adequate plus” (>109 %).

Data Analysis

We used descriptive statistics to report demographic characteristics for the study population. Chi-square analysis was

used to assess the association between dual high risk, high medical risk, high psychosocial risk and low-risk categories and prenatal care utilization. Logistic regression was used to determine risk factors for overutilization and underutilization of prenatal care. All analyses were conducted with STATA[®] 11 (StataCorp, College Station, TX). A *p* value of <0.05 was considered statistically significant.

Results

The sample consisted of 786 participants (Table 1). Most women were Caucasian 76.3 % (600), multiparous 52.8 % (415) and the majority had private health insurance 93.8 % (737). Approximately 90 % (706) of the women were married or cohabiting. Over three-fourths of the women in the study graduated from high school 78.5 % (617). The mean age of participants was 29 years (range 18–53). Participants attended an average of 11.6 standard prenatal visits during their pregnancy (range 1–27). All of the participants attended at least one prenatal care visit. Over 25 % (202) of pregnancies were high medical risk, 22.7 % (178) of pregnancies were high psychosocial risk, 28.9 % (227) of pregnancies were dual high risk and 22.8 % (179) of pregnancies were low-risk (Fig. 1).

Prenatal care utilization patterns stratified by risk are shown in Fig. 2. Dual high risk pregnancies were the most likely (31.3 %) to receive “adequate plus” prenatal care compared to women in the other three risk categories. High medical risk pregnancies were also more likely (25.7 %) to receive “adequate plus” prenatal care services when

Table 1 Cohort characteristics (n = 786)

| | |
|--|--------------|
| Mean maternal age (±SD) | 29.4 (± 5.5) |
| Maternal education | |
| Post college education | 243 (30.9 %) |
| Some college or college graduate | 374 (47.6 %) |
| </=High school | 169 (21.5 %) |
| Relationship status | |
| Married or cohabitating | 706 (89.8 %) |
| Single | 75 (9.5 %) |
| Parity | |
| Multiparous | 415 (52.8 %) |
| Nulliparous | 371 (47.2 %) |
| Race | |
| Caucasian | 600 (76.3 %) |
| Minority (African American, Hispanic, Asian) | 186 (23.7 %) |
| Insurance | |
| Private insurance | 737 (93.8 %) |
| Medicaid | 49 (6.2 %) |

All values are presented as n (%) unless otherwise indicated

Fig. 1 Stratification of risk

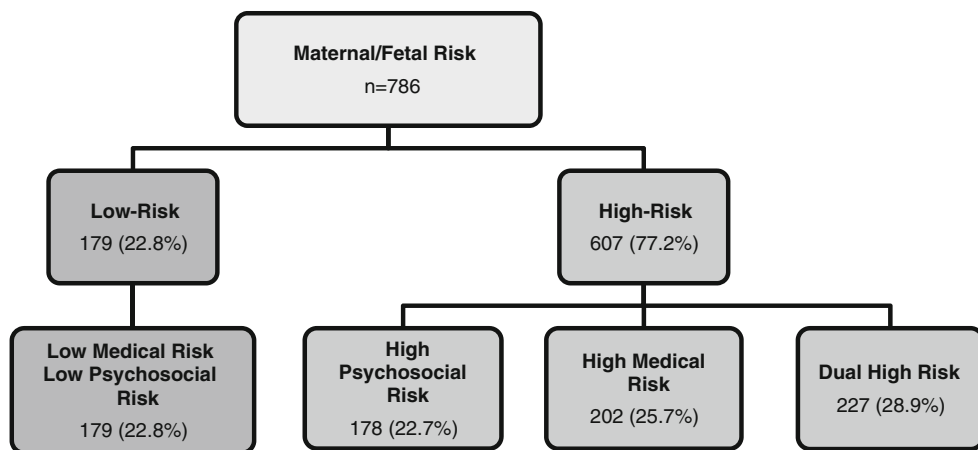
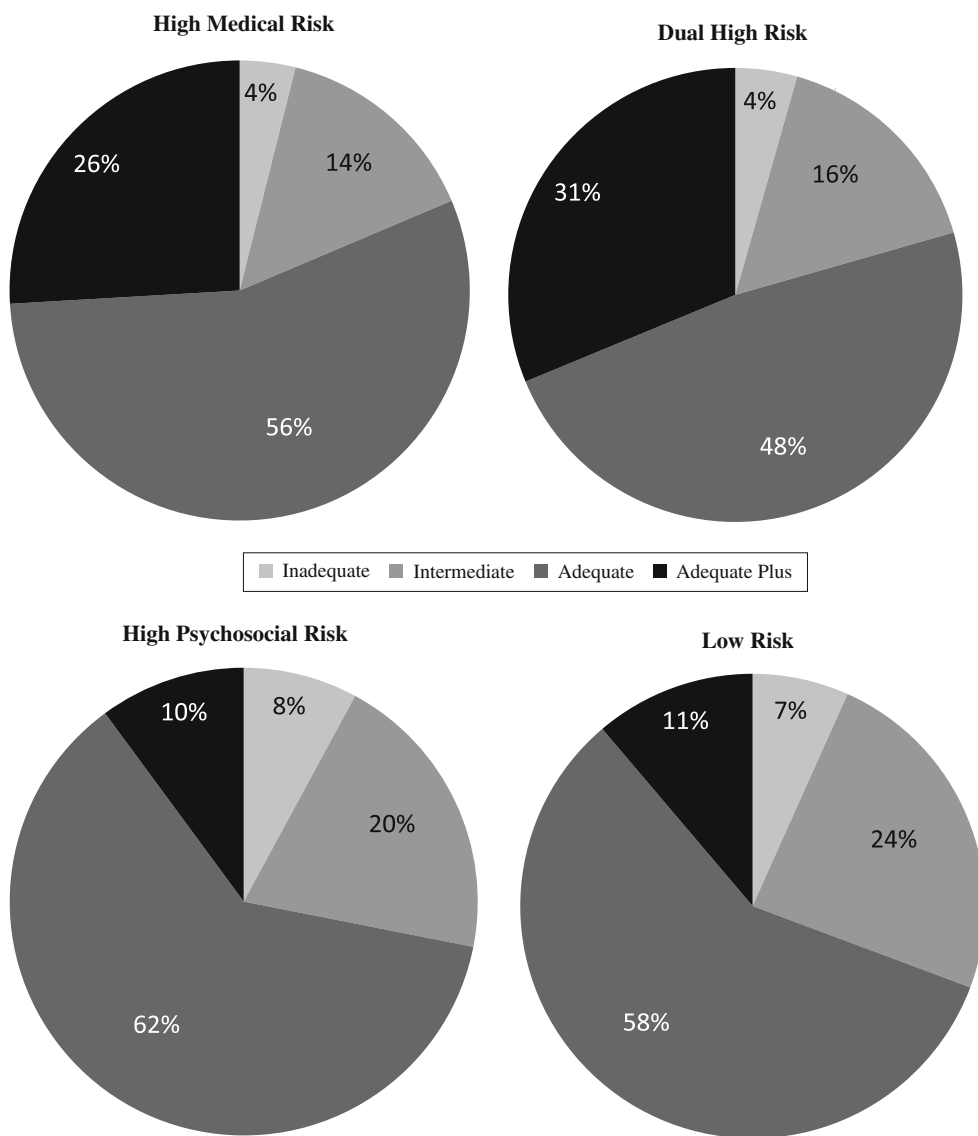


Fig. 2 Prenatal care utilization stratified by risk



compared to women at high psychosocial risk (10.1 %). Little difference was found between the prenatal care utilization patterns of women with psychosocial risk factors

and low-risk women (10.1 % “adequate plus” vs. 11.2 % “adequate plus”). More than one-fourth (28.1 %) of women with psychosocial risk factors received less than

Table 2 Predictors of intensive versus inadequate prenatal care utilization

| | Intensive ("adequate plus") | Inadequate ("intermediate or inadequate") |
|-----------------------------------|-----------------------------------|---|
| Risk | | |
| High medical risk | 0.72 (0.47–1.10) | 0.99 (0.60–1.62) |
| High psychosocial risk | 0.23 (0.13–0.41) ^b | 1.69 (1.06–2.72) ^a |
| Low-risk | 0.25 (0.14–0.43) ^b | 2.13 (1.33–3.42) ^b |
| Race | | |
| African American/ Latina/other | 0.94 (0.61–1.44) | 1.18 (0.80–1.74) |
| Insurance | | |
| Medicaid | 0.56 (0.24–1.31) | 2.40 (1.29–4.47) ^b |
| Parity | | |
| Multiparous (Parity > 1) | 0.66 (0.46–0.94) ^a | 1.94 (1.37–2.75) ^b |

Results adjusted for insurance status, risk, parity and race, ^a $p < 0.05$,
^b $p < 0.01$

adequate prenatal care (either "inadequate" or "intermediate" care), compared to 20.3 % of women at dual high risk and 18.3 % of women at high medical risk.

In multivariate analysis, we examined the odds of receiving inadequate ("intermediate" or "inadequate") care versus care of greater intensity as well as the odds of receiving intensive or "adequate plus" care versus care of lesser intensity (Table 2). Women at high psychosocial risk (OR = 1.69; 95 % CI 1.06–2.72), Medicaid recipients (2.40; 1.29–4.47), multiparous women (1.94; 1.37–2.75) and low-risk women (2.13; 1.33–3.42) were significantly more likely to receive inadequate ("intermediate" or "inadequate") prenatal care than care of greater intensity when adjusting for race, parity and risk status. Women at high psychosocial risk (0.23; 0.13–0.41), low-risk women (0.25; 0.14–0.43) and multiparous women (0.66; 0.46–0.94) were significantly less likely to receive intensive or "adequate plus" prenatal care.

Discussion

The US Public Health Service Expert Panel on the Content of Prenatal Care noted that a "risk-responsive" approach to prenatal care delivery should result in an increase in the number of visits and contacts during pregnancy to "identify needs and initiate interventions."⁷ In contrast to a standardized prenatal care model, this risk-responsive approach is designed to deliver intensive prenatal care services for high-risk patients and basic, but essential services for low-risk patients. Thus, through identification and stratification of risk, risk-appropriate prenatal care delivery

is intended to improve the efficiency and effectiveness of prenatal care.

Despite evidence-based recommendations, our findings from this longitudinal study indicate that many women do not receive risk-appropriate prenatal care services. Of the high-risk categories that we evaluated, women with pregnancies complicated by psychosocial risk factors did not receive intensive prenatal care services as frequently as their high medical risk counterparts. While over 30 % of women at dual high risk and 25 % of women at high medical risk received intensive prenatal care, only 11 % of women at high psychosocial risk received intensive or "adequate plus" prenatal care. In fact, there was no difference between the prenatal care utilization rates of high psychosocial risk pregnancies and low-risk pregnancies.

The difference in the intensity of prenatal care use between women with medical and psychosocial risk factors is concerning as outcomes are worse for women at high psychosocial risk who do not receive additional prenatal care services. A population-based secondary analysis of over 5,000 women demonstrated that mothers with a history of depressive disorder who attended less than 7 prenatal care visits were significantly more likely to deliver LBW, preterm and SGA infants when compared to mothers with a history of depressive disorder who attended at least 10 prenatal care visits [24]. Moreover, psychosocial risk factors such as depression and anxiety, IPV, tobacco use and substance abuse have been successfully reduced in pilot interventions involving intensive, risk-appropriate prenatal care [10, 25].

The discrepancy between the prenatal care utilization patterns of high psychosocial risk versus high medical risk pregnancies may be due to patient level factors. Psychosocial risk factors such as depression have been repeatedly associated with independent effects on negative health practices during pregnancy [26, 27]. In an analysis of vital statistics data from California of over one million women, Kelly et al. [28] found that women with psychiatric and substance abuse diagnoses demonstrated a significantly increased risk of inadequate prenatal care utilization compared to women without those psychosocial risk factors. In addition, in a secondary analysis of a randomized controlled trial, Magriples et al. [29] found that women with psychosocial risk factors such as marijuana use and low prenatal care knowledge were more likely to have inadequate prenatal care utilization.

In addition to patient factors, provider factors may also contribute to disparate prenatal care utilization patterns of high medical and high psychosocial risk patients. Medical risk factors, such as hypertension and diabetes, are often identified through screening and diagnostic tests that are objective and have relatively standardized interpretations. In contrast, some psychosocial risk factors may not have a standardized definition and/or may lack a standardized

means of assessment which may be difficult for providers to evaluate and address [30]. Results from a Canadian study of family practice physicians found that many physicians believe that a psychosocial risk assessment is “unnecessary,” while others were not aware of any evidence that addressing psychosocial risk factors improved outcomes [31].

In addition to high-risk women, many low-risk women failed to receive risk-appropriate prenatal care services. Over 10 % of low-risk women received intensive prenatal care services despite an absence of any medical or psychosocial risk factors. A potentially unnecessary overutilization of prenatal care services by low-risk women has profound implications for access to care and resource availability. Excessive low-risk visits have the potential to reduce access to care and decrease health care worker time and availability for higher risk patients which justifiably consume more health care resources. Prenatal care visits that are not medically indicated also has the potential to increase the false positive rate of clinical evaluations which can lead to unnecessary monitoring, testing and interventions that may cause iatrogenic harm.

Finally, a significant percentage of our cohort received inadequate prenatal care regardless of risk status. Of high-risk patients, approximately 20 % of women at dual high risk and 19 % of women at high medical risk received less than adequate prenatal care. In addition, over 28 % of women at high psychosocial risk received less than adequate prenatal care. In multivariate analysis, women with psychosocial risk factors and women whose prenatal care was paid for by state Medicaid plans had significantly greater odds of inadequate prenatal care use. This discrepancy in prenatal care utilization by insurance status has previously been established [32].

Our study must be interpreted in light of certain limitations. This study sample represents a predominantly Caucasian, well-educated, multiparous population with private insurance and our results may not be generalizable to minority patients from low-socioeconomic communities. In addition, our study evaluated only prenatal care timing and frequency and did not take into account the prenatal care content provided during each visit. We also did not account for risk factors such as a history of low birth weight that were not documented in the medical record. Our study also did not account for additional visits with other clinical providers such as social work, psychiatry or other behavioral health services. A failure to account for health care visits with other clinical providers that may have addressed psychosocial risk factors may have contributed to the lack of intensive prenatal care visits for women at high psychosocial risk. Larger sample sizes are needed to evaluate the relationship between risk, prenatal care utilization and adverse birth outcomes such as low birth weight. Increasing the amount of prenatal

care visits for women with psychosocial risk factors may improve the effectiveness of prenatal care for this high-risk patient population.

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References

1. Institute of Medicine. (1985). *Preventing low birthweight*. Washington DC: National Academy Press.
2. St John, E. B., Nelson, K. G., Cliver, S. P., Bishnoi, R. R., & Goldenberg, R. L. (2000). Cost of neonatal care according to gestational age at birth and survival status. *American Journal of Obstetrics and Gynecology*, *182*, 170–175.
3. Borders, A. E., Grobman, W. A., Amsden, L. B., & Holl, J. L. (2007). Chronic stress and low birth weight neonates in a low-income population of women. *Obstetrics and Gynecology*, *109*, 331–338.
4. Littleton, H. L., Bye, K., Buck, K., & Amacker, A. (2010). Psychosocial stress during pregnancy and perinatal outcomes: A meta-analytic review. *Journal of Psychosomatic Obstetrics and Gynaecology*, *31*, 219–228.
5. Ferrazzani, S., Luciano, R., Garofalo, S., et al. (2011). Neonatal outcome in hypertensive disorders of pregnancy. *Early Human Development*, *87*, 445–449.
6. Antepartum Care. (2007). In *Guidelines for perinatal care*, 6th edn. American Academy of Pediatrics, American College of Obstetricians and Gynecologists.
7. US Public Health Service. (1989). *Caring for our future: The content of prenatal care*. Washington (DC): Department of Health and Human Services.
8. Ickovics, J. R., Kershaw, T. S., Westdahl, C., et al. (2007). Group prenatal care and perinatal outcomes: A randomized controlled trial. *Obstetrics and Gynaecology*, *110*, 330–339.
9. Newman, R. B., Sullivan, S. A., Menard, M. K., et al. (2008). South Carolina partners for preterm birth prevention: A regional perinatal initiative for the reduction of premature birth in a Medicaid population. *American Journal of Obstetrics and Gynecology*, *199*(393), e1–e8.
10. Joseph, J. G., El-Mohandes, A. A., Kiely, M., et al. (2009). Reducing psychosocial and behavioral pregnancy risk factors: Results of a randomized clinical trial among high-risk pregnant African American women. *American Journal of Public Health*, *99*, 1053–1061.
11. Lewis, C., Mathews, T., & Heuser, R. (1996). Prenatal care in the United States, 1980–94. National center for health statistics. *Vital Health Statistics*, *21*, 1–19.
12. Hamilton, B., Martin, J., & Ventura, S. (2010). Births: Preliminary data for 2008. National Center for Health Statistics. *National Vital Statistics Report*, *58*, 1–18.
13. Lancaster, C. A., Flynn, H. A., Johnson, T. R. B., Marcus, S. M., & Davis, M. M. (2010). Peripartum length of stay for women

- with depressive symptoms during pregnancy. *J Womens Health*, 19, 31–37.
14. Robins, L. N., Helzer, J. E., Croughan, J., & Ratcliff, K. S. (1981). National institute of mental health diagnostic interview schedule. Its history, characteristics, and validity. *Archives of General Psychiatry*, 38, 381–389.
 15. Chang, G. G. (2001). Alcohol-screening instruments for pregnant women. *Alcohol Research & Health*, 25, 204–209.
 16. Bradley, K. A., Boyd-Wickizer, J., Powell, S. H., & Burman, M. L. (1998). Alcohol screening questionnaires in women: A critical review. *JAMA*, 280, 166–171.
 17. Radloff, L. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, 1, 385–401.
 18. Campbell, S. B., & Cohn, J. F. (1991). Prevalence and correlates of postpartum depression in first-time mothers. *Journal of Abnormal Psychology*, 100, 594–599.
 19. Gaynes, B. G., Meltzer-Brody, S., Lohr, K., et al. (2005). *Perinatal depression: Prevalence, screening accuracy, and screening outcomes. Evidence Report/Technology Assessment No. 119. AHRQ Publication NO 05-E006-2*. Rockville, MD: Agency for Healthcare Research and Quality.
 20. Husaini, B. (1980). Depression in rural communities: Validating the CES-D scale. *Journal of Community Psychology*, 8, 20–27.
 21. Myers, J. K., & Weissman, M. M. (1980). Use of a self-report symptom scale to detect depression in a community sample. *American Journal of Psychiatry*, 137, 1081–1084.
 22. Rush, A., First, M., & Blacker, D. (Eds.). (2008). *Handbook of psychiatric measures* (2nd ed.). Arlington, VA: American Psychiatric Publishing, Inc.
 23. Kotelchuck, M. (1994). An evaluation of the Kessner adequacy of prenatal care index and a proposed adequacy of prenatal care utilization index. *American Journal of Public Health*, 84, 1414–1420.
 24. Chen, C., & Lin, H. (2011). Prenatal care and adverse pregnancy outcomes among women with depression: A nationwide population-based study. *Canadian Journal of Psychiatry*, 56, 273–280.
 25. Kiely, M., El-Mohandes, A. A., El-Khorazaty, M. N., & Gantz, M. G. (2010). An integrated intervention to reduce intimate partner violence in pregnancy: A randomized controlled trial. *Obstetrics and Gynecology*, 115, 273–283.
 26. Zuckerman, B., Amaro, H., Bauchner, H., & Cabral, H. (1989). Depressive symptoms during pregnancy: Relationship to poor health behaviors. *American Journal of Obstetrics and Gynecology*, 160, 1107–1111.
 27. Lindgren, K. (2001). Relationships among maternal-fetal attachment, prenatal depression, and health practices in pregnancy. *Research in Nursing Health*, 24, 203–217.
 28. Kelly, R. H., Danielsen, B. H., Golding, J. M., Anders, T. F., Gilbert, W. M., & Zatzick, D. F. (1999). Adequacy of prenatal care among women with psychiatric diagnoses giving birth in California in 1994 and 1995. *Psychiatric Services*, 50, 1584–1590.
 29. Magriples, U., Kershaw, T. S., Rising, S. S., Massey, Z., & Ickovics, J. R. (2008). Prenatal health care beyond the obstetrics service: Utilization and predictors of unscheduled care. *American Journal of Obstetrics and Gynecology*, 198(75), e1–e7.
 30. Martikainen, P., Bartley, M., & Lahelma, E. (2002). Psychosocial determinants of health in social epidemiology. *International Journal of Epidemiology*, 31, 1091–1093.
 31. Carroll, J. C., Reid, A. J., Biringir, A., Wilson, L. M., & Midmer, D. K. (1994). Psychosocial risk factors during pregnancy. What do family physicians ask about? *Canadian Family Physician*, 40, 1280–1289.
 32. Weir, S., Posner, H. E., Zhang, J., Willis, G., Baxter, J. D., & Clark, R. E. (2011). Predictors of prenatal and postpartum care adequacy in a Medicaid managed care population. *Women's Health Issues*, 21, 277–285.